

Figure 3.9 shows the modern periodic table of elements. It is organized into groups (vertical columns) and periods (horizontal rows). The groups are labeled IA through VIIA, plus noble gases. The periods are labeled 1 through 7. The table includes atomic numbers and atomic masses for each element. The lanthanide and actinide series are shown at the bottom. Callouts point to Hydrogen (H) and Helium (He) with labels for 'Atomic number' and 'Atomic mass'.

Most of the elements are metals.

Figure 3.9

The modern periodic table of the elements.

Members of a group in the periodic table bear resemblance to each other as do members of a family – hence the term, family of elements.

The periodic table in use today (sometimes called the “long” form of the periodic table) is shown in Figure 3.9. We see that, like Mendeleev’s table, it is constructed of a number of vertical columns, called **groups**, each containing a *family of elements*. These groups are identified by a Roman numeral and a letter, either A or B. Groups IA through VIIA and Group 0 are referred to collectively as the **representative elements**, while Groups IB through VIIB and Group VIII (actually composed of the three short columns in the center of the table) constitute the **transition elements**. Similarities between properties of the A- and B-group elements exist, although the similarities are often very weak.

Finally, we see that there are two long rows of elements lying just below the main part of the table. These elements, called the **inner transition elements**, actually belong in the body of the table but are placed where they are simply to conserve space. The first of these rows, elements 58 through 71, fit into the chart following lanthanum and is collectively called the **lanthanides** or the **rare earths**. The second row, elements 90 through 103, belongs between actinium ($Z = 89$) and element 104. The elements in this series are termed the **actinides**.

The horizontal rows in the periodic table are called **periods** and are designated by means of Arabic numerals. The elements hydrogen and helium are members of the first period; lithium through neon are known as second-period elements; and so on.

Certain families of elements are characterized by names as well as by their group number. For example, the Group IA elements are frequently spoken of as the **alkali metals** because certain of their compounds are caustic or “alkaline.” The Group IIA elements are called the **alkaline earth metals**; these elements are found in minerals and certain of their compounds are caustic, too. The Group VIIA elements are called the **halogens**, a name derived from the Greek meaning “salt former.” Finally, the Group 0 elements are the **noble gases** (they are also sometimes called the *inert gases*) because of their extremely limited ability to react chemically.

The elements can also be broadly classified as **metals**, **nonmetals**, or **metalloids**. You are probably familiar with most of the physical properties that serve to identify metals: high electrical conductivity, luster, generally high melting

Sodium hydroxide (NaOH) is called caustic soda.

3.9 ELECTROM,

Figure 3.10

Properties of a wave.